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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/019,390	03/01/2002	Frank Thom	616.99USWO	6339

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EXAMINER
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YUAN, DAH WEI D

ART UNIT	PAPER NUMBER
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1745

DATE MAILED: 08/27/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Applicati n N .

10/019,390

Applicant(s)

THOM, FRANK

Examiner

Dah-Wei D. Yuan

Art Unit

1745

-- The MAILING DATE of this communication appears on th cover sheet with the c rrespondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-6 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-3 and 6 is/are rejected.
- 7) ☒ Claim(s) 4 and 5 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 01 March 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  - ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_ 6) ☐ Other:

**COOLING SYSTEM FOR FUEL CELLS**

Examiner: Yuan      S.N. 10/019,390      Art Unit: 1745      August 22, 2003

***Claim Objections***

1. Claims 5 is objected to because of the following informalities.

Claim 5 recites the limitation "the size and/or density of the holes at the edge" in Lines 1-2. It is not clear what the limitation is referred to. For the interest of compact prosecution, claim 5 is examined as a dependent claim on claim 4, in which "the size and/or density of the holes" is recited.

***Claim Rejections - 35 USC § 102***

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1-3,6 are rejected under 35 U.S.C. 102(b) as being anticipated by Hsu et al. (US 5,338,622).

With respect to claims 1,6, Hsu et al. teach a thermal management system (10) comprising a heat source (fuel cell assembly) (12) and a heat sink (heat exchanger or cooling device) (20). The fuel cell assembly radiates heat to the heat exchanger as shown in wavy arrows in figure 1. The heat exchanger serves to facilitate the removal of heat from the fuel cell

assembly. The heat transfer between the heat exchanger and the fuel cell primarily relies upon thermal radiation. A method to operate the thermal management device is also taught. See Column 3, Lines 13-18, 37-41.

With respect to claim 2, the heat exchanger comprises concentric tubular structures that are preferably axially spaced. See Figure 5. The heat exchanger is positioned at locations near the fuel cell that comprises fuel supply and exhaust means. See Figure 5.

With respect to claim 3, in one embodiment, the heat exchanger (62) has a substantially annular configuration and surrounds a fuel cell stack (12) as shown in Figure 7. The heat exchanger inner surface is heated either by heat radiated by the fuel cell stack or by direct contact with the adjacent fuel cell stack, i.e., a housing is shared. See Column 6, Lines 9-24.

4. Claims 1-3,6 are rejected under 35 U.S.C. 102(b) as being anticipated by Hsu et al. (WO 94/13026).

With respect to claim 1,6, Hsu et al. teach a high temperature electrochemical converter that performs fuel-to-electricity conversion. The heat transfer unit (30) (cooling device) serves to facilitate the removal or addition of thermal energy to the converter elements (21). Heat transfer from the converter elements to the heat transfer elements primarily relies upon thermal radiation from the converters. A method to operate the electrochemical converter is also taught See Page 1, Lines 7-10; Page 2, Lines 37-38; Page 7, Lines 11-12.

With respect to claim 2, the heat transfer unit (30) is formed from tubes and is situated near the fuel and spent fuel space. See Figure 1.

With respect to claim 3, the bulk integration of converter elements (21) and heat transport elements (31) is achieved by alternating the elements 21 and 31 in an interdigitated array as show in Figure 4. As a result, they share the same housing. See Column 7, Lines 11-14.

5. Claims 1-3,6 are rejected under 35 U.S.C. 102(b) as being anticipated by Kitamura et al. (JP 09007624 A).

With respect to claims 1,6, Kitamura et al. teach a solid oxide fuel cell system comprising a fuel cell stack (4) and a radiating type heat exchanger (15). A method to operate the solid oxide fuel cell system is also taught. See Abstract.

With respect to claim 2, the heat exchanger tube is positioned near the fue exhaust space (12). See Figure 1.

With respect to claim 3, both the fuel cell stack and heat exchanger are housed in an enclosure (11). See Figure 1.

***Allowable Subject Matter***

6. Claims 4,5 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Claim 4,5 would be allowable because the prior art does not disclose or suggest the use of a perforated plate, in which the size and/or density of the holes increases from a midline to the edge and the midline runs parallel to the flow direction of the working medium.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dah-Wei D. Yuan whose telephone number is (703) 308-0766. The examiner can normally be reached on Monday-Friday (8:00-5:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick J. Ryan, can be reached on (703) 308-2383. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9310 for regular communications and (703) 872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

Dah-Wei D. Yuan  
August 25, 2003

